

WHAT IS CLAIMED IS:

1           1.     A method for monitoring depletion of a consumable resource in a  
2 monitored system, comprising:  
3           receiving information on at least one unit of work to be processed by the  
4 monitored system, wherein the monitored system would deplete the consumable resource  
5 when processing each unit of work;  
6           determining a rate of resource depletion per unit of work processed;  
7           estimating an amount of resource remaining after the monitored system processes  
8 the at least one unit of work, wherein the estimate is a function of the determined rate of  
9 resource depletion and a number of the one or more units of work to process; and  
10          generating a graphical element for display on a computer monitor indicating the  
11 estimated amount of the resource remaining.

1           2.     The method of claim 1, wherein the graphical display comprises a  
2 graphical gauge displaying a range of values from zero to a maximum capacity of the  
3 consumable resource in the monitored system, wherein the estimated amount of the  
4 resource remaining is indicated on the gauge.

1           3.     The method of claim 2, wherein indicating the estimated amount of the  
2 resource remaining on the gauge comprises displaying a graphical needle on the gauge  
3 pointing to a position on the gauge indicating the estimated amount of the resource  
4 remaining.

1           4.     The method of claim 1, further comprising:  
2           estimating a number of units of work that can be processed with the estimated  
3 amount of the resource remaining; and  
4           generating information to display with the generated graphical element indicating  
5 the estimated number of units of work.

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8. The method of claim 1, wherein multiple systems are monitored, wherein the estimated amount of resource remaining is determined for each monitored system, and at least one graphical element is displayed on the computer monitor for each

4 determining a material composition of the consumable resource in the printer; and

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1           15.     The method of claim 9, further comprising:  
2           determining whether the estimated amount of the resource remaining indicates  
3     that the consumable resource is depleted in the monitored printer; and  
4           generating a message indicating that there is not a sufficient amount of the  
5     resource remaining to process the number of pages in the print job if the resource is  
6     determined to be depleted in the monitored system.

**SECRET**

1 16. The method of claim 9, further comprising:  
2 determining at least one attribute of the print job; and  
3 determining one attribute factor for each determined attribute of the print job,  
4 wherein the determined at least one attribute factor is used to estimate the amount of the  
5 resource remaining.

1 17. The method of claim 16, wherein the consumable resource comprises  
2 toner and wherein the determined attributes of the print job include contrast and boldness.

1 18. The method of claim 17, further comprising:  
2 providing a contrast table and boldness table providing different contrast and  
3 boldness factors, respectively, for different contrast and boldness settings.

1 19. The method of claim 9, wherein the graphical display comprises a  
2 graphical gauge displaying a range of values from zero to a maximum capacity of the  
3 consumable resource in the monitored system, wherein the estimated amount of the  
4 consumable resource remaining is indicated on the gauge.

1 20. The method of claim 19, wherein the printer is a color printer, and wherein  
2 resource depletion is monitored for multiple color toners used in the monitored printer,  
3 wherein one gauge is displayed for each color toner in the printer

1 21. The method of claim 19, wherein the consumable resource is monitored at  
2 multiple printers and the amount of resource remaining is estimated for each monitored  
3 printer, further comprising displaying one graphical gauge indicating the estimated  
4 amount of the resource remaining for each monitored printer.

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1            25.     The system of claim 24, wherein the graphical display comprises a  
2   graphical gauge displaying a range of values from zero to a maximum capacity of the

3 consumable resource in the monitored system, wherein the estimated amount of the  
4 resource remaining is indicated on the gauge.

1 26. The system of claim 24, wherein the processing unit further includes:  
2 means for receiving notification that the consumable resource is depleted in the  
3 monitored system; and  
4 means for determining an adjustment factor if the estimated amount of resource  
5 remaining is not estimated to be depleted, wherein the adjustment factor is applied when  
6 estimating the amount of resource remaining during use of the monitored system after the  
7 consumable resource is replenished in the monitored system.

1 27. The system of claim 24, further comprising:  
2 multiple systems using the consumable resource;  
3 wherein the processing unit is in communication with the multiple systems, and  
4 wherein the processing unit further includes:  
5 (i) means for monitoring the multiple systems;  
6 (ii) means for determining the estimated amount of resource remaining for  
7 each monitored system; and  
8 (iii) means for displaying at least one graphical element on the computer  
9 monitor for each monitored system indicating the estimated amount of the  
10 resource remaining for the monitored system.

1 28. A system for monitoring depletion of a consumable resource, comprising:  
2 (a) a printer; and  
3 (c) a computer monitor; and  
4 (b) a processing unit in communication with the printer and the computer monitor,  
5 comprising:

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- 6 (i) means for receiving a print job having print matter for at least one  
7 page;  
8 determining a rate of resource depletion per page;  
9 (ii) means for estimating an amount of resource remaining after the printer  
10 processes the print job as a function of a number of the at least one page in the  
11 print job and the determined rate of resource depletion; and  
12 (iii) means for generating a graphical element for display on a computer  
13 monitor indicating the estimated amount of the resource remaining.

1 29. The system of claim 28, wherein the processing unit further comprises:  
2 means for providing a data structure indicating one rate of resource depletion for  
3 different printers; and  
4 means for determining an identifier of the printer to print the print job, wherein  
5 determining the rate of resource depletion comprises determining the rate of resource  
6 depletion in the data structure corresponding to the determined identifier of the printer.

1 30. The system of claim 28, wherein the data structure provides rate of  
2 resource depletions for different material compositions used for the consumable resource,  
3 wherein the means for determining the rate of resource depletion further performs:  
4 determining a material composition of the consumable resource in the printer; and  
5 determining the rate of resource depletion in the data structure for the determined  
6 material composition.

1 31. The system of claim 28, wherein the processing unit further comprises:  
2 means for receiving notification from the printer that the consumable resource is  
3 depleted in the monitored printer; and  
4 means for determining an adjustment factor if the estimated amount of resource  
5 remaining is not estimated to be depleted, wherein the adjustment factor is applied when

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6 estimating the amount of resource remaining during use of the monitored printer after the  
7 consumable resource is replenished in the printer.

1 32. The system of claim 28, wherein the processing unit further includes:  
2 means for determining at least one attribute of the print job; and  
3 means for determining one attribute factor for each determined attribute of the  
4 print job, wherein the determined at least one attribute factor is used to estimate the  
5 amount of the resource remaining.

1 33. The system of claim 28, wherein the graphical display comprises a  
2 graphical gauge displaying a range of values from zero to a maximum capacity of the  
3 consumable resource in the monitored system, wherein the estimated amount of the  
4 consumable resource remaining is indicated on the gauge.

1 34. The system of claim 33, wherein the printer is a color printer, and wherein  
2 resource depletion is monitored for multiple color toners used in the monitored printer,  
3 wherein one gauge is displayed for each color toner in the printer

1 35. The method of claim 33, wherein the consumable resource is monitored at  
2 multiple printers and the amount of resource remaining is estimated for each monitored  
3 printer, further comprising displaying one graphical gauge indicating the estimated  
4 amount of the resource remaining for each monitored printer.

1 36. An article of manufacture including code method for monitoring depletion  
2 of a consumable resource in a monitored system and displaying information on a  
3 computer monitor, wherein the code causes operations to be performed comprising:

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1            39.     The article of manufacture of claim 36, further comprising:  
2            estimating a number of units of work that can be processed with the estimated  
3     amount of the resource remaining; and  
4            generating information to display with the generated graphical element indicating  
5     the estimated number of units of work.

1 40. The article of manufacture of claim 36, further comprising:  
2 receiving notification that the consumable resource is depleted in the monitored  
3 system; and  
4 determining an adjustment factor if the estimated amount of resource remaining is  
5 not estimated to be depleted, wherein the adjustment factor is applied when estimating  
6 the amount of resource remaining during use of the monitored system after the  
7 consumable resource is replenished in the monitored system.

1 41. The article of manufacture of claim 36, further comprising:  
2 after the consumable resource is fully replenished, initializing the estimated  
3 amount of resource remaining to full capacity, wherein estimating the amount of resource  
4 remaining comprises:

5 (i) multiplying the number of one or more units of work to process times  
6 the rate of resource depletion to estimate an amount of resource depletion that  
7 results from processing the at least one unit of work; and

8 (ii) setting the estimated amount of resource remaining to the estimated  
9 amount of resource remaining minus the estimated amount of resource depletion.

1 42. The article of manufacture of claim 36, further comprising:  
2 determining whether the estimated amount of the resource remaining indicates  
3 that the consumable resource is depleted in the monitored system; and  
4 generating a message indicating that there is not a sufficient amount of resource  
5 remaining to process the at least one unit of work if the resource is determined to be  
6 depleted in the monitored system.

1 43. The article of manufacture of claim 36, wherein multiple systems are  
2 monitored, wherein the estimated amount of resource remaining is determined for each  
3 monitored system, and at least one graphical element is displayed on the computer

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4 monitor for each monitored system indicating the estimated amount of the resource  
5 remaining for the monitored system.

1 44 An article of manufacture including code for monitoring depletion of a  
2 consumable resource in a printer, wherein the code causes operations to be performed  
3 comprising:  
4 receiving a print job having print matter for at least one page;  
5 determining a rate of resource depletion per page;  
6 estimating an amount of resource remaining after the printer processes the print  
7 job as a function of a number of the at least one page in the print job and the determined  
8 rate of resource depletion; and  
9 generating a graphical element for display on a computer monitor indicating the  
10 estimated amount of the resource remaining.

1 45. The article of manufacture of claim 44, further comprising:  
2 providing a data structure indicating one rate of resource depletion for different  
3 printers; and  
4 determining an identifier of the printer to print the print job, wherein determining  
5 the rate of resource depletion comprises determining the rate of resource depletion in the  
6 data structure corresponding to the determined identifier of the printer.

1 46. The article of manufacture of claim 45, wherein the identifier of the  
2 printer comprises one of a printer model and a unique name of the printer that will  
3 process the print job.

1 47. The article of manufacture of claim 45, wherein the data structure  
2 provides rate of resource depletions for different material compositions used for the

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3 consumable resource, wherein determining the rate of resource depletion further  
4 comprises:

5 determining a material composition of the consumable resource in the printer; and  
6 determining the rate of resource depletion in the data structure for the determined  
7 material composition.

1 48. The article of manufacture of claim 44, further comprising:  
2 receiving notification from the printer that the consumable resource is depleted in  
3 the monitored printer; and

4 determining an adjustment factor if the estimated amount of resource remaining is  
5 not estimated to be depleted, wherein the adjustment factor is applied when estimating  
6 the amount of resource remaining during use of the monitored printer after the  
7 consumable resource is replenished in the printer.

1 49. The article of manufacture of claim 44, further comprising:  
2 after the consumable resource is fully replenished, initializing the amount of  
3 resource remaining to full capacity, wherein estimating the amount of resource remaining  
4 comprises:

5 (i) multiplying the number of pages in the print job times the determined  
6 rate of resource depletion to estimate an amount of resource depletion from at the  
7 printer when processing the print job; and

8 (ii) setting the estimated amount of resource remaining to the estimated  
9 amount of resource remaining minus the estimated amount of resource depletion.

1 50. The article of manufacture of claim 44, further comprising:  
2 determining whether the estimated amount of the resource remaining indicates  
3 that the consumable resource is depleted in the monitored printer; and

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4 generating a message indicating that there is not a sufficient amount of the  
5 resource remaining to process the number of pages in the print job if the resource is  
6 determined to be depleted in the monitored system.

1 51. The article of manufacture of claim 44, further comprising:  
2 determining at least one attribute of the print job; and  
3 determining one attribute factor for each determined attribute of the print job,  
4 wherein the determined at least one attribute factor is used to estimate the amount of the  
5 resource remaining.

1 52. The article of manufacture of claim 51, wherein the consumable resource  
2 comprises toner and wherein the determined attributes of the print job include contrast  
3 and boldness.

1 53. The article of manufacture of claim 52, further comprising:  
2 providing a contrast table and boldness table providing different contrast and  
3 boldness factors, respectively, for different contrast and boldness settings.

1 54. The method of claim 9, wherein the graphical display comprises a  
2 graphical gauge displaying a range of values from zero to a maximum capacity of the  
3 consumable resource in the monitored system, wherein the estimated amount of the  
4 consumable resource remaining is indicated on the gauge.

1 55. The method of claim 54, wherein the printer is a color printer, and wherein  
2 resource depletion is monitored for multiple color toners used in the monitored printer,  
3 wherein one gauge is displayed for each color toner in the printer

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1           56.    The article of manufacture of claim 54, wherein the consumable resource  
2 is monitored at multiple printers and the amount of resource remaining is estimated for  
3 each monitored printer, further comprising displaying one graphical gauge indicating the  
4 estimated amount of the resource remaining for each monitored printer.

1           57.    The article of manufacture of claim 44, further comprising:  
2           estimating a number of pages that can be processed with the estimated amount of  
3 the resource remaining; and  
4           generating information to display with the generated graphical element indicating  
5 the estimated number of pages.

1           58.    The article of manufacture of claim 44, wherein the monitored  
2 consumable resource is one of toner and fuser oil.

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